AMENDED CLAIMS

[Received by the International Bureau on 29 October 2005 (29.10.2005) original claims 1 and 17 amended, original claim 10 cancelled, new claim 21 added]

1. An apparatus for generating hydrogen by hydrolytic reaction and for supplying said hydrogen to a user device, said apparatus comprising:

at least one reactor vessel containing a supply of a metal composite reactant material;

means for selectively supplying water to said metal composite reactant material in said reactor vessel so as to produce said hydrolytic reaction therein; and

buffer storage that receives said hydrogen from said reactor vessel at a first, relatively higher pressure, and that releases said hydrogen to said user device at a second, relatively lower pressure;

said hydrogen being supplied to said user device via said buffer storage so that said user device receives said hydrogen at said second, relatively lower pressure and not at said first, relatively higher pressure.

2. The apparatus of claim 1, wherein said user device is a fuel cell having a predetermined maximum allowable supply pressure, and wherein said buffer storage is configured to release said hydrogen to said fuel cell at a pressure at or below said predetermined maximum allowable supply pressure.

3. The apparatus of claim 1, wherein said metal composite material in said reactor vessel comprises:

a mechanical amalgam of metallic aluminum and calcined alumina compressed to pellet form, that enables said hydrolytic reaction to proceed under near-neutral pH conditions.

4. The apparatus of claim 1, wherein said buffer storage comprises:

a plurality of buffer vessels; and

means for switching flow of said hydrogen between said buffer vessels on an alternating basis so that a first said buffer vessel is receiving said hydrogen from said reactor vessel while a second said buffer vessel is releasing said hydrogen to said user device.

5. The apparatus of claim 4, wherein each of said buffer vessels comprises:

a vessel holding a supply of metal hydride material.

6. The apparatus of claim 1, wherein said means for selectively supplying water to said metal composite reactant material in said reactor vessel comprises:

a water line connecting said reactor vessel to a supply of water;

a valve mounted in said water line for controlling flow of water to said reactor vessel therethrough; and

control means for selectively opening said valve in response to a demand for hydrogen by said user device.

7. The apparatus of claim 6, wherein said control means comprises:

a pressure sensor that senses pressure of said hydrogen in a flow thereof to said user device; and

means for opening said valve in response to a predetermined drop in pressure detected by said pressure sensor.

8. The apparatus of claim 7, wherein said means for opening said valve comprises:

an electronic processor that receives an output signal from said pressure sensor.

9. The apparatus of claim 1, further comprising:

a plurality of said reactor vessels, each reactor vessel holding a supply of said metal composite material.

10. (Cancelled)

11. An apparatus for generating hydrogen by hydrolytic reaction and for supplying said hydrogen to a fuel cell having a predetermined maximum allowable supply pressure, said apparatus comprising:

at least one reactor vessel holding a supply of an aluminum composite reactant material;

means for selectively supplying water to said aluminum composite reactant material in said reactor vessel so as to produce said hydrolytic reaction therein;

a plurality of buffer vessels that receive said hydrogen from said at least one reactor vessel at a first, relatively higher pressure and that release said hydrogen to said fuel cell at a second, relatively lower pressure at or below said maximum allowable supply pressure of said fuel cell, each of said buffer vessels holding a supply of metal hydride material for absorbing and releasing said hydrogen; and

means for switching flow of said hydrogen between said buffer vessels on an alternating basis so that a first said buffer vessel is receiving said hydrogen from said at least one reactor vessel while a second said buffer vessel is releasing said hydrogen to said fuel cell.

12. The apparatus of claim 11, wherein said means for selectively supplying water to said aluminum composite reactant material in said at least one reactor vessel comprises:

a water line connecting said reactor vessel to a supply of water;

a valve mounted in said water line for controlling flow of water to said reactor vessel therethrough; and

control means for selectively opening said valve in response to a demand for hydrogen by said fuel cell.

13. The apparatus of claim 12, wherein said control means comprises:

a pressure sensor that senses pressure of said hydrogen in a flow thereof to said fuel cell; and

means for opening said valve in response to a predetermined drop in pressure detected by said pressure sensor.

14. The apparatus of claim 12, wherein said at least one reactor vessel comprises:

a plurality of said reactor vessels, each holding a supply of said aluminum composite reactant material.

15. The apparatus of claim 14, wherein said means for selectively supplying water to said aluminum composite reactant material in said reactor vessels comprises:

means for controlling supply of water to each of said plurality of reactor vessels on a separate basis, so that said hydrolytic reaction can be selectively produced in said reactor vessels in a sequential, staged or phased manner.

16. A method for supplying hydrogen to a fuel cell having a predetermined maximum allowable supply pressure, said method comprising the steps of:

selectively supplying water to an aluminum composite reactant material in at least one reactor vessel so as to produce a hydrolytic reaction that generates hydrogen;

supplying said hydrogen from said reactor vessel to at least one buffer storage at a first, relatively higher pressure; and

releasing said hydrogen from said buffer storage to said fuel cell at a second, relatively lower pressure that is at or below said maximum allowable supply pressure of said fuel cell.

17. The method of claim 16, further comprising the step of:

providing said at least one reactor vessel with an aluminum composite material that comprises a mechanical amalgam of metallic aluminum and calcined alumina compressed to pellet form, that enables said hydrolytic reaction to proceed under near neutral pH conditions.

18. The method of claim 17, further comprising the step of:

switching flow of said hydrogen between a plurality of said buffer storage vessels on an alternating basis so that a first said buffer vessel is receiving said hydrogen from said reactor vessel at said relatively higher

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pressure while a second said buffer vessel is releasing said hydrogen to said fuel cell at said relatively lower pressure.

19. The method of claim 18, wherein the step of selectively supplying water to said aluminum composite reactant material in said at least one reactor vessel comprises:

selectively opening a valve in a water supply line to said reactor vessel in response to a demand for hydrogen by said fuel cell.

20. The method of claim 19, wherein the step of selectively opening a valve in said water supply line comprises:

opening said valve in response to a drop of pressure sensed in a flow of said hydrogen to said fuel cell.

21. An apparatus for generating hydrogen by hydrolytic reaction and for supplying said hydrogen to a user device, said apparatus comprising:

a plurality of reactor vessels, each reactor vessel containing a supply of a metal composite reactant material:

means for selectively supplying water to said metal composite reactant material in said reactor vessel so as to produce said hydrolytic reaction therein, said means for selectively supplying water to said metal composite reactant material comprising means for controlling supply of water to each of said plurality of reactor vessels on a separate basis, so that said hydrolytic reaction can be selectively produced in said reactor vessels in a sequential, staged or phased manner; and

buffer storage that receives said hydrogen from said reactor vessels at a first, relatively higher pressure, and that releases said hydrogen to said user device at a second, relatively lower pressure.

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